Editorial

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Editorial

The triannual Nordic Research Symposium on Science Education (NFSUN) was held in Helsinki during the summer of 2014. About 120 science education researchers presented their ongoing research. Altogether, there were almost 200 participants in the conference. Approximately 60 participants came from Sweden, and about 30 each came from Denmark, Finland, and Norway. There were participants from Iceland as well. In addition, there were participants from every continent except Africa. The conference was organized around the 16 strands, similar to the European Science Education Research Association conferences.

This special issue presents the selected papers of the NFSUN conference. Scholars who presented their research at the conference were invited to submit papers to the NFSUN special issue. We received a reasonable number of submissions, which were sent to independent reviewers, at least two of whom were senior researchers. We are glad that so many senior researcher form Nordic countries devoted their time to reviewing the manuscripts.

In addition to senior researchers, we asked PhD students to review some of the papers. We have found this to be fruitful for several reasons. Being a referee is an important task for a researcher, so it is good to gain experience in this area. Quite often, a PhD dissertation is a collection of journal articles with a concluding summary. When PhD. students read manuscripts and are asked to evaluate them, they learn what kinds of argumentation and writing styles are understandable. Following Marton's way of thinking, one needs to see the variation in texts. If a student sees only good examples, such as published papers, it is difficult to recognize what makes a paper well-written. Another beneficial aspect is that PhD. students engage in careful reading and write detailed comments on the papers. Of course, senior researchers' evaluations are also needed to recognize crucial aspects of the manuscripts. Furthermore, we have done editorial work in order to help the authors better communicate their findings. How well we have succeeded in this will be seen in the future citations of the papers. We encourage all researchers in Nordic countries to consider whether it is possible to show the connection to the Nordic context in papers intended for a broad international audience. As seen in the conference, Nordic science education is seen as interesting all over the world.

As part of the general evaluation criteria for NorDiNa, we took the possible international interest into consideration when selecting the papers for this special issue. The published issue includes several papers that should interest readers beyond the Nordic science education community. The reasons for the international interest are multifold. There are papers describing innovative methods for educational design research and experience sampling via smart phones. There are also papers with novel perspectives on internationally hot topics such as formative assessment.

Tuomas Aivelo and Anna Uitto analyze how Finnish upper secondary school biology textbooks present genetic determinism. In a rapidly developing field such as genetics, there is a constant need for discussion on how to include the most recent research and models into the national curricula and textbooks. Based on their analysis, Aivelo and Uitto suggest that gene models be presented explicitly to reduce misconceptions about genes.

Berit Bungum, Carl Angell, Cathrine W. Tellefsen and Maria Vetleseter Bøe describes in their paper educational design–based research on improving the teaching and learning of quantum physics and relativity. Based on literature and their experiences piloting the teaching module, they present design principles and explain how these principles can be implemented in teaching modules.

Inger Edfors, Susanne Wikman, Brita Johansson Cederblad and Cedric Linder focused on representations in genetics and stereochemistry. Students did not seem to be very capable of using representations in their problem solving.

Ann-Catherine Henriksson investigated primary schoolteachers' perceptions to communicate pupils' previous knowledge. Although a constructivist view of teaching and learning emphasizes pupils' previous knowledge, teachers tend to take students' previous knowledge into consideration only rather superficial manners.

Janna Linnasaari, Jaana Viljaranta, Jari Lavonen, Barbara Schneider and Katariina Salmela-Aro studied Finnish students' engagement in exact science and life science lessons through an innovative research setting utilizing a smartphone application. The smartphone application included an experience sampling method questionnaire and was programmed to emit a signal at random times during, before and after the science lessons.

The study by Niclas Åhman, Gunilla Gunnarsson and Inger Edfors discusses a tool for teachers' professional development. During the investigation period of the study, the focus of the teachers' discussions changed from a pragmatic approach to a more reflective approach. The results indicate that working with the Content Representations tool stimulated the teachers to express and discuss their knowledge and beliefs about and attitudes towards teaching.

We believe that this special issue showcases the variety of the themes, approaches and methods being explored in Nordic science education research.

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